

IN THE CLAIMS:

1 1. (Currently Amended) A system for replay of a backup memory in a storage sys-  
2 tem having a file system for managing transfer of data to and from an attached disk array,  
3 the system comprising:  
4       a log in the backup memory containing the storage system transaction entries ac-  
5 cumulated after a consistency point at which time results of the storage system transac-  
6 tion entries are committed to the disk array;  
7       an initiator process that establishes a swarm of messages with respect to the stor-  
8 age system transaction request entries and delivers the swarm to the file system; and  
9       a disk information-retrieval process in the file system that is carried out on the  
10 swarm of messages in parallel.

1 11 2. (Original) The system as set forth in claim 1 wherein each of the messages of the  
2 swarm is identified by a transaction block including a pointer to one of the transaction  
3 request entries in the log, respectively, and a state that indicates whether each of the mes-  
4 sages is one of (a) newly transferred to the file system, (b) subject to completion of a  
5 LOAD phase thereon by the disk information-retrieval process, (c) subject to completion  
6 of a MODIFY phase thereon by a MODIFY process of the file system or (d) incapable of  
7 being subject to the LOAD phase until a prerequisite event occurs.

1 12 3. (Original) The system as set forth in claim 2 wherein the prerequisite event is com-  
2 pletion of the LOAD phase and a MODIFY phase with respect to another of the mes-  
3 sages.

1 13 4. (Original) The system as set forth in claim 3 wherein the initiator process is adapted  
2 to retransfer each of the messages incapable of being subject to a load phase until the pre-

3     requisite event occurs to the file system for completion of the LOAD phase after the pre-  
4     requisite event occurs, respectively.

1     5. (Original) The system as set forth in claim 4 wherein the initiator is adapted to establish a skip state with respect to skipped messages for which a portion of the disk array associated therewith is unavailable, the skip state thereby omitting the skipped messages from the swarm.

1     6. (Original) The system as set forth in claim 4 wherein the file system includes a panic state adapted to alert an operator if a first message received from the initiator in the swarm is a message incapable of being subject to a load phase until a prerequisite event occurs.

1     7. (Original) The system as set forth in claim 4 wherein the file system includes a panic state adapted to alert an operator if a message retransferred by the initiator process is a message incapable of being subject to a load phase until a prerequisite event occurs.

1     8. (Original) The system as set forth in claim 1 wherein the backup memory comprises a non-volatile random access memory (NVRAM).

1     9. (Original) The system as set forth in claim 1 wherein the storage system comprises a network storage appliance.

1     10. (Original) A method for replay of a backup memory in a storage system having a file system for managing transfer of data to and from an attached disk array, the method comprising:

4                 accumulating, in a log in the backup memory, storage system transaction request entries after a consistency point at which time results of the transaction request entries are committed to the disk array;

7                   establishing a swarm of messages with respect to the transaction request entries  
8    and delivering the swarm to the file system; and  
9                   performing a disk information-retrieval process of the file system on the swarm of  
10   messages in parallel.

1    11. (Original) The method as set forth in claim 10 further comprising establishing, for  
2    each of the messages of the swarm, a transaction block including a pointer to one of the  
3    transaction request entries in the log, respectively, and a state that indicates whether each  
4    of the messages is one of (a) newly transferred to the file system, (b) subject to comple-  
5    tion of a LOAD phase thereon by the disk information-retrieval process, (c) subject to  
6    completion of a MODIFY phase thereon by a MODIFY process of the file system or (d)  
7    incapable of being subject to the LOAD phase until a prerequisite event occurs.

1    12. (Original) The method as set forth in claim 11 wherein the prerequisite event is com-  
2    pletion of the LOAD phase and a MODIFY phase with respect to another of the mes-  
3    sages.

1    13. (Original) The method as set forth in claim 12 further comprising retransferring each  
2    of the messages incapable of being subject to a load phase until the prerequisite event oc-  
3    curs to the file system for completion of the LOAD phase after the prerequisite event oc-  
4    curs, respectively.

1    14. (Original) The method as set forth in claim 10 wherein the storage system comprises  
2    a network storage appliance.

1    15. (Original) A computer-readable medium including program instructions executing on  
2    a computer for parallelized replay of a backup memory in a storage system having a file  
3    system for managing transfer of data to and from an attached disk array, the program in-  
4    structions performing the steps of:

5            accumulating, in a log in the backup memory, storage system transaction request  
6    entries after a consistency point at which results of the transaction request entries are  
7    committed to the disk array;  
8            establishing a swarm of messages with respect to the transaction request entries  
9    and delivering the swarm to the file system; and  
10          performing a disk information-retrieval process of the file system on the swarm of  
11    messages in parallel.

1        16. (Original) The computer-readable medium as set forth in claim 15 further comprising  
2    establishing, for each of the messages of the swarm, a transaction block including a  
3    pointer to one of the transaction request entries in the log, respectively, in the log and a  
4    state that indicates whether each of the messages is one of (a) newly transferred to the file  
5    system, (b) subject to completion of the LOAD phase thereon by the disk information-  
6    retrieval process, (c) subject to completion of a MODIFY phase thereon by a MODIFY  
7    process of the file system or (d) incapable of being subject to the LOAD phase until a  
8    prerequisite event occurs.

1        17. (Original) The computer-readable medium as set forth in claim 16 wherein the pre-  
2    requisite event is completion of the LOAD phase and a MODIFY phase with respect to  
3    another of the messages.

1        18. (Original) The computer-readable medium as set forth in claim 17 further comprising  
2    retransferring each of the messages incapable of being subject to a load phase until the  
3    prerequisite event occurs to the file system for completion of the LOAD phase after the  
4    prerequisite event occurs, respectively.

1        19. (Original) The computer-readable medium as set forth in claim 15 wherein the stor-  
2    age system comprises a network storage appliance.